

9.0 TRANSMISSION SYSTEM RESPONSES

9.1 Appendix B (g)(2)(C)

Comment

The System Impact Study Report submitted with the AFC was found inadequate and incomplete. Submit a new System Impact Study Report, the study to be performed by using a industry recognized Power Flow program (Example-GE PSLF for the first year operation with 2003 Western System Coordinating Council (WSCC) base cases for 134 MW nominal output of new generation. Analyze the system impact with and without the project during peak (summer) and off-peak system (spring) conditions, which will demonstrate conformance or non-conformance with the WSCC, California Independent System Operator (Cal-ISO) and utility reliability and planning criteria with the following provisions:

- a. Identify major assumptions in the base cases including imports and exports to the system, major generations including hydro, load changes in the system and queue generation.
- b. Analyze system for Power Flow for N-0, important N-1 and critical N-2 contingency conditions, and provide a list of overload criteria violations in one table showing the loadings before and after adding the new generation and their differences side by side.
- c. Analyze system for Transient Stability and Post-transient voltage conditions under critical N-1 and N-2 contingencies, and provide related plots, switching data and a list of voltage criteria violations if any for adding the new generation (if available).
- d. Provide a Short Circuit Study Report in one table showing fault currents at important substation buses with and without the new generation and respective breaker interrupting ratings side by side (if available).
- e. Identify the reliability and planning criteria utilized to determine the criteria violation.
- f. Provide a list of contingencies evaluated for each study.
- g. List mitigation measures considered (required) and those selected (if available) for all criteria violations.
- h. Provide electronic copies of *.sav and *.drw GE PSLF and EPCL contingency files (if available).

Provide power flow diagrams (MVA, % loading & P. U. voltage for base cases with and without the 134 MW generation project. Power flow diagrams must also be provided for all N- 0, N-1 and N-2 studies where overloads or voltage violations appear.

Response

A new System Impact/Facilities Study plan was developed in consultation with CEC staff and CAL-ISO staff. A copy of the plan is presented in Appendix C.

The results of the System Impact/Facilities Study, which demonstrate conformance with the WSCC, CAL-ISO, and utility reliability and planning criteria, are presented in Attachment 1, System Impact Study. Copies of the GEPSLF and EPCL contingency files (*.sav, *.acn or .pfp, and *.drw) and the dynamic data (* dyd and *swt) files are provided in the electronic submittals.

9.2 Appendix B (g)(2)(D)

Comment

Provide a full description of the new interconnection facilities and downstream facilities, the facilities requiring modifications or reconductoring. For their environmental settings and impacts, provide routes and detail environmental analysis and any recommended mitigation measures (Note: The new System Impact Study for the year 2003 must be completed first).

Response

The new System Impact Study is submitted as Attachment 1, which identifies no impacts to the environment

9.3 Appendix B (h)(2)

Comment

Indicate when preliminary approval from California Independent System Operator will be obtained on completion of the new impact study.

Response

The System Impact Study report was submitted to the CAL-ISO. CAL-ISO staff has approved the results presented in the SIS report. The CAL-ISO letter is reproduced in Figure 9-1.

9.4 §2022 (b)(3)(A)

Comment

The System Impact Study Report submitted with the AFC was found inadequate and incomplete. Submit a new System Impact Study Report, the study to be performed by using a industry recognized Power Flow program (Example-GE PSLF for the first year operation with 2003 Western System Coordinating Council (WSCC) base cases for 134 MW nominal output of new generation. Analyze the system impact with and without the project during peak (summer) and off-peak system (spring) conditions, which will demonstrate conformance or non-conformance with the WSCC, California Independent System Operator (Cal-ISO) and utility reliability and planning criteria with the following provisions:

- a. Identify major assumptions in the base cases including imports and exports to the system, major generations including hydro, load changes in the system and queue generation.
- b. Analyze system for Power Flow for N-0, important N-1 and critical N-2 contingency conditions, and provide a list of overload criteria violations in one table showing the loadings before and after adding the new generation and their differences side by side.
- c. Analyze system for Transient Stability and Post-transient voltage conditions under critical N-1 and N-2 contingencies, and provide related plots, switching data and a list of voltage criteria violations if any for adding the new generation (if available).
- d. Provide a Short Circuit Study Report in one table showing fault currents at important substation buses with and without the new generation and respective breaker interrupting ratings side by side (if available).
- e. Identify the reliability and planning criteria utilized to determine the criteria violation.
- f. Provide a list of contingencies evaluated for each study.
- g. List mitigation measures considered (required) and those selected (if available) for all criteria violations.
- h. Provide electronic copies of *.sav and *.drw GE PSLF and EPCL contingency files (if available).

Provide power flow diagrams (MVA, % loading & P. U. voltage for base cases with and without the 134 MW generation project. Power flow diagrams must also be provided for all N- 0, N-1 and N-2 studies where overloads or voltage violations appear.

Response

The results of the System Impact/Facilities Study, which demonstrate conformance with the WSCC, CAL-ISO, and utility reliability and planning criteria, are presented in Attachment 1, System Impact Study. Copies of the GEPSLF and EPCL contingency files (*.sav, *.acn or *.pfp, and *.drw) and the dynamic data (* dyd and *swt) files are provided in the electronic submittals.

This Systems Impact/Facilities Study was deemed adequate in a response received by the City from CEC in March 2002. The CEC asked for the following additional information if available:

- 1. Short Circuit Study: For each substation low and high sides, within the systems of Southern California Edison, Los Angeles Department of Water and Power, and City of Vernon, identify and list in a table number of breakers which are overstressed due to fault current increments for addition of Malburg Generating Station (MGS) and will need replacement in consultation with the respective transmission owner. Provide existing and proposed ratings of the breakers to be replaced. If possible, alternatives to replacement of breakers may be explored.**
- 2. Transient Stability Study: Perform a dynamic simulation for eight cycle (or as required in consultation with the transmission owner) three-phase fault at the Vernon 66 kV substation bus followed by full load rejection (outage of all lines from Vernon Substation) of MGS and provide related plots.**
- 3. Power Flow Study: Perform the following contingency runs (line or breaker to breaker) and provide results:**
 - a. N-1 Conditions: Outage of Vernon-Owill 66 kV Line, Vernon-Leon Tap 66kV Line, Vernon-VS Tap 66kV line, and Leon Tap-Leonis 66 kV Line.**
 - b. N-2 Conditions: Outage of Vernon-Owill and Vernon-Leon Tap 66 kV Lines, Vernon-Owill and Leon Tap-Leonis 66 kV Lines, Vernon-Leon Tap and Vernon-VS Tap 66 kV Lines.**

These additional studies have been performed and are provided as Appendix F in Attachment 1, System Impact/Facilities Study.

9.5 §2022 (b)(2)(B)

Comment

Provide a full description of the new interconnection facilities and downstream facilities, and the facilities requiring modifications, reconductoring or any other project. For their environmental settings and impacts, provide routes and detail environmental analysis (including other technical areas related to transmission) and any recommended mitigation measures (Note: The new System Impact Study must be completed first).

Response

The results of the System Impact/Facilities Study, which demonstrate conformance with the WSCC, CAL-ISO, and utility reliability and planning criteria, are presented in Attachment 1, System Impact Study.

Figure 9-1 Letter from California ISO

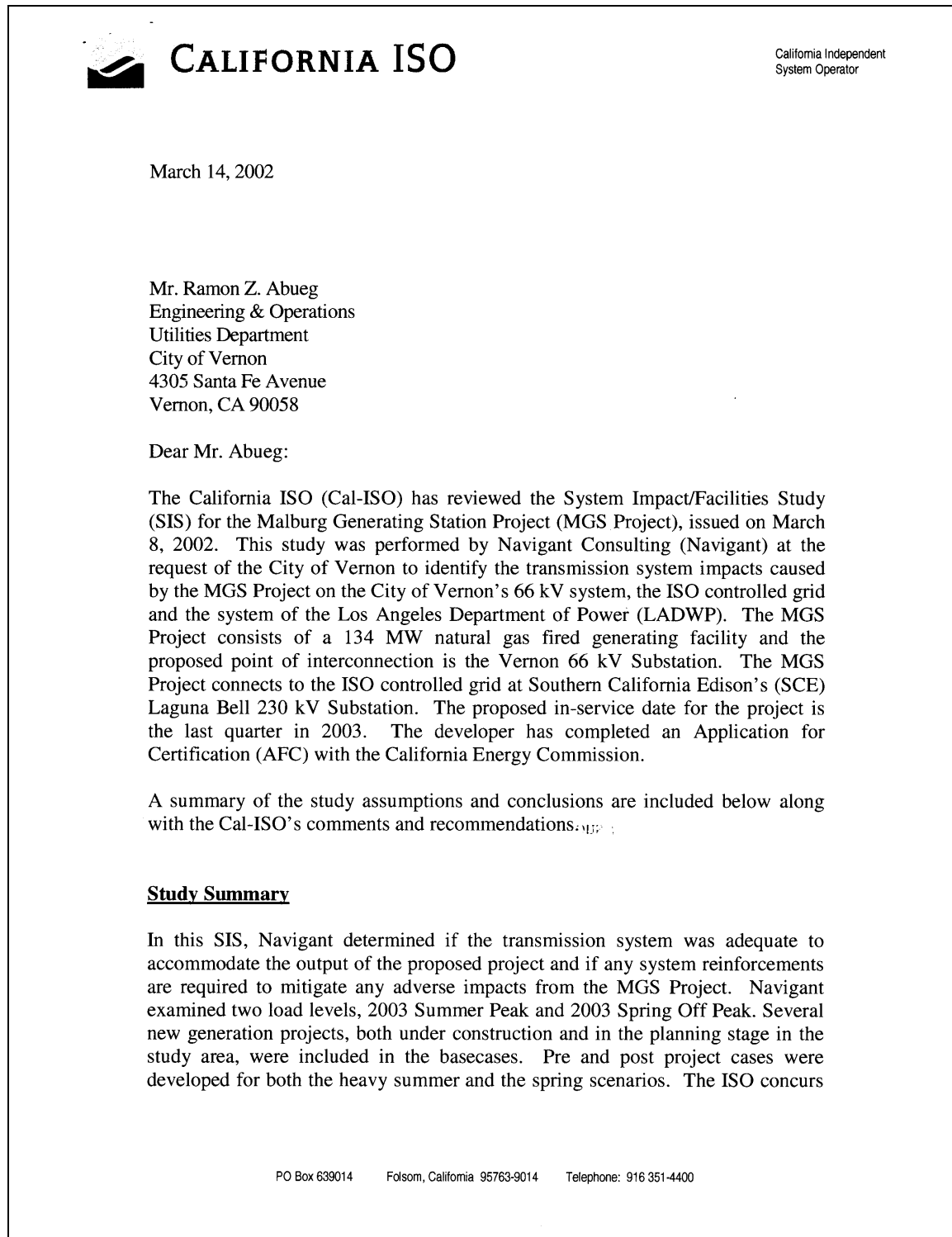


Figure 9-1 Letter from California ISO (continued)

with Navigant's study approach. Navigant applied the Cal-ISO Grid Planning Standards in their analysis of the impacts on the ISO controlled grid.

Power Flow Analysis

The power flow analysis did not identify any normal overloads (N-0) with the addition of the MGS Project. The MGS Project did not create any new emergency overloads (N-1, N-2) and existing emergency overloads were not aggravated by the addition of the Malburg Generating Station Project. The SIS concluded that the MGS Project does not have any negative thermal impact on the system in the study area.

Transient Stability Studies

The study did not identify any violation of the transient stability criteria.

Post Transient Voltage Study

No post transient voltage studies were performed since power flow results did not identify any outages that resulted in voltage deviations of 5% or greater.

Short Circuit Duty Study

Three-phase-to-ground and single-phase-to-ground short circuit duties were increased at eight 230 kV SCE substations by 0.1 kA or more. The Laguna Bell 230 kV Substation experienced the largest increase (1.03 kA). Also, some 66 kV busses in the Vernon 66 kV system and some LADWP busses experienced an increase in fault duty.

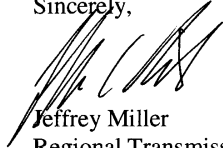
Cal-ISO Comments and Recommendations

- The Cal-ISO concurs with the conclusion in the SIS that the addition of the Malburg Generating Station Project does not adversely impact the reliability of the ISO Controlled Grid. Although the increases in fault duty on the SCE 230 kV system are small, the Cal-ISO recommends the developer to submit a copy of SIS to SCE for review. The Cal-ISO does not have the minimum breaker ratings for SCE's substations, which are necessary to evaluate the need for breaker replacements.

Figure 9-1 Letter from California ISO (continued)

If you have any questions about the Cal-ISO's review of this study, please call me at (916) 351- 4464 (jmillier@caiso.com) or Johan Galleberg at (916) 351-2313 (jgalleberg@caiso.com).

Sincerely,



Jeffrey Miller
Regional Transmission Manager

CC: Dave Larsen (Navigant Consulting, Inc.)
Al McCuen (CEC)
Rich Cashdollar (ISO)
Armando Perez (ISO)
Chuck Wu (ISO)
Nam Nguyen (ISO)
Gary Brown (ISO)
Steve Rutty (ISO via e-mail)
Grid Planning (via e-mail)

APPENDIX C

SYSTEM IMPACT/FACILITIES STUDY PLAN

INTRODUCTION AND PROJECT DESCRIPTION

The City of Vernon (City) is undertaking the development of a 134 MW (nominal) natural gas-fired generating facility, the Malburg Generating Station Project (MGS Project), at the existing generation site located within the City. The MGS Project will be interconnected with Vernon's 66-kV transmission system at the existing Vernon Substation. Vernon's 66-kV system is interconnected with the California ISO-controlled grid at the Laguna Bell Substation of Southern California Edison (Edison).

The proposed operational date for the MGS Project is the fourth quarter of 2003; it will be configured as a 2X1 combined cycle generating facility consisting of:

- Two gas-fired combustion turbine/generators each with a nominal rating of 43 MW,
- One steam turbine/generator with a nominal rating of 50 MW, and
- 13.8/66-kV step-up transformers for the three generating units

The City has requested that Navigant Consulting, Inc. (NCI) conduct a System Impact /Facility Study (Study) for the MGS Project to provide the City with the information on transmission system impacts required for the MGS Project Application for Certification (AFC) to the California Energy Commission (CEC). The Study will be undertaken in conformance with WSCC, California Independent System Operator (Cal- ISO), and utility reliability and planning criteria and will identify:

1A. The Interconnected facilities and alternates considered.

1. The impacts caused by the MGS Project on the interconnected transmission system in the Study Area (Vernon, LADWP and SCE areas) during both peak and off-peak conditions, and
2. The system reinforcements (including reratings) or other actions (such as Special protection Schemes (SPS) or any other remedial actions) necessary to mitigate adverse impacts of the MGS Project.

POWER FLOW BASE CASE ASSUMPTIONS

Powerflow cases modeling 2003 summer peak load conditions and 2003 spring off-peak load conditions will be used in the Study. These cases will be developed from a 2003 summer peak prepared in late 2001 and currently being used in Edison's annual transmissions assessment and from 2003 summer peak and spring off-peak cases which NCI obtained from Edison in February of 2001. These cases will be modified, as appropriate, to reflect:

1. The most recent estimate of Edison system loads.
2. The Vernon 66-kV transmission system and associated recent estimates of loads and resources.
3. Other new generating facilities that are proposed to be interconnected with the Edison system and which have been approved or are under review by the CEC including:
 - a. The 750 MW Pastoria Energy Facility interconnected with the Pastoria 230-kV Substation,
 - b. The 850 MW High Desert Powerplant Project interconnected with the 230-kV system at the Victor Substation,
 - c. The 1,056 MW Mountainview Power Project interconnected with the 230-kV system at the Etiwanda Substation,
 - d. The 450 MW Huntington Beach Repower Project,
 - e. The 630 MW El Segundo Repower Project, and
 - f. The 670 MW Inland Empire Energy Center interconnected with Edison's Valley Substation.

The modified cases will serve as "pre-MGS Project" reference point cases for the studies. They will be further modified to develop two "post-MGS Project" cases including the proposed MGS Project.

STUDY SCOPE

The Study will assess the interconnected facilities and the impacts of the MGS Project on the interconnected transmission system in the Study Area (the 66-kV system of Vernon, LADWP area and the 230-kV ISO-controlled grid west of Mira Loma/Serrano and south of Rio Hondo/Mesa) and will identify system reinforcements or other actions necessary to mitigate adverse impacts of the MGS Project.

Steady State Power Flow Studies

The pre- and post-MGS Project cases described above will be used to assess the impact of the MGS Project during normal operating (N-0) conditions as well as when single and multiple (ISO Category "B" and "C") outages are simulated on facilities within the Study Area. The single contingencies (ISO Category "B") and selected multiple contingencies (ISO Category "C") include the following outages:

ISO Category "B"

- Single generator outages
- Single transmission circuit outages
- Single transformer outages
- A single transmission circuit and one generator out of service

ISO Category "C"

- Selected bus outages
- Selected outages caused by breaker failures (excluding bus tie and sectionalizing breakers)
- Two element (generator/transmission line/transformer) outages
- Outages of double circuit tower lines (Appendix D lists the 230-kV N-2 outages to be simulated on the Edison system)

The results of these studies will be summarized in a table showing the loadings on impacted facilities both without and with the MGS Project. In addition, powerflow one-line diagrams will be provided for the pre- and post-MGS Project base cases and for the studies of N-1 or N-2 outages where overloads or voltage violations are noted.

Dynamic Stability Analysis

Dynamic stability studies will be conducted using the 2003 base cases discussed above to ensure that the transmission system remains in operating equilibrium through abnormal operating conditions after the MGS Project begins operation. Disturbance simulations will be performed for a study period of 20 seconds to determine whether the new facility will create any system instability as a result of full load rejection of Project generation and selected Category "B" and Category "C" Contingencies. The results of these studies will be presented in both graphical (plot) and tabular form; including any voltage criteria violation due to the addition of the MGS Project.

Short Circuit Studies

Short circuit studies will be performed to determine the degree to which the addition of generation to the system increases fault duties at the City's substations, at the Laguna Bell 230-kV bus, and at the other 230-kV busses within the Study Area (as defined above). These studies will determine the maximum three phase and single line-to-ground fault currents at these locations both without and with the MGS Project. The resultant pre- and post-MGS Project information will be summarized in tabular form and will be compared to information obtained from the City and Edison (if possible) on

breaker duties at these locations to identify breakers whose interrupting capability is exceeded due to the addition of the MGS Project.

Post -Transient Power Flow Studies

A post transient study will be performed on outages that result in voltage deviations of 5% or greater as indicated in the power flow studies. The results of these studies will be presented tabular form; including any voltage criteria violation due to the addition of the MGS Project.

Transmission Line and Substation Evaluations

These evaluations will rely on the information developed during the performance of the above Studies and on publicly available information to identify existing transmission lines or existing substation equipment that might have to be replaced or upgraded due to the addition of the MGS Project.

Documentation of Results

The results of the Study will be documented in a report that will:

1. Provide a complete description of the new interconnection and downstream facilities and the facilities requiring modifications or any other project as required for the MGS Project. Provide a Map with transmission network showing the location of the new generation and the new/impacted facilities.
2. Summarize the basic data and assumption (such as imports and exports to the system, major existing generation facilities on-line, system loads, and proposed new generating facilities on-line) used in the Study.
3. Identify the reliability and planning criteria applied in the Study.
4. Summarize the results of the Study including the identification of system impacts and the measures for mitigating these impacts that were considered and selected.
5. Include the following appendices:
 - a. Powerflow plots, summary tables, and contingency lists for powerflow studies
 - b. Plots, summary tables, and switching routines for transient stability studies

- c. Q-V plots, summary tables, and switching routines for post-transient studies
- d. Machine information for the MGS Project generators

In addition to the above, electronic copies of the powerflow data (*.sav) files, drawing (*.drw) files, and contingency (*.acn or *.pfp) files, the dynamic data (* dyd and *swt) files will be provided.

APPENDIX D

N-2 OUTAGES ON EDISON SYSTEM

**** CASE NUMBER **** 1

OPEN LINE

"CHINO 230.00" "MIRALOMA 230.00" "1 " 1

OPEN LINE

"CHINO 230.00" "MIRALOMA 230.00" "2 " 1

DONE

**** CASE NUMBER **** 2

OPEN LINE

"CHINO 230.00" "MIRALOMA 230.00" "2 " 1

OPEN LINE

"CHINO 230.00" "MIRALOMA 230.00" "3 " 1

DONE

**** CASE NUMBER **** 3

OPEN LINE

"CHINO 230.00" "MIRALOMA 230.00" "1 " 1

OPEN LINE

"CHINO 230.00" "MIRALOMA 230.00" "3 " 1

DONE

**** CASE NUMBER **** 4

OPEN LINE

"CHINO 230.00" "S.ONOFRE 230.00" "1 " 1

OPEN LINE

"CHINO 230.00" "SERRANO 230.00" "1 " 1

DONE

**** CASE NUMBER **** 5

OPEN LINE

"ETIWANDA 230.00" "MIRALOMA 230.00" "1 " 1

OPEN LINE

"ETIWANDA 230.00" "PADUA 230.00" "1 " 1

DONE

**** CASE NUMBER **** 6

OPEN LINE

"MIRALOMA 230.00" "OLINDA 230.00" "1 " 1

OPEN LINE

"MIRALOMA 230.00" "WALNUT 230.00" "1 " 1

DONE

**** CASE NUMBER **** 7

OPEN LINE

"MESA CAL 230.00" "ANTELOPE 230.00" "1 " 1

OPEN LINE

"VINCENT 230.00" "ANTELOPE 230.00" "1 " 1

DONE

**** CASE NUMBER **** 8

OPEN LINE

"MESA CAL 230.00" "ANTELOPE 230.00" "1 " 1

OPEN LINE

"RIOHONDO 230.00" "VINCENT 230.00" "2 " 1

DONE

**** CASE NUMBER **** 9

OPEN LINE

"MIRALOMA 230.00" "VSTA 230.00" "1 " 1

OPEN LINE

"MIRALOMA 230.00" "VSTA 230.00" "2 " 1

DONE

**** CASE NUMBER **** 10

OPEN LINE

"LEWIS 230.0" "SERRANO 230.0" "1 " 1

OPEN LINE

"LEWIS 230.0" "SERRANO 230.0" "2 " 1

DONE

**** CASE NUMBER **** 11

OPEN LINE

"EL NIDO 230.0" "LA FRESA 230.0" "1 " 1

OPEN LINE

"EL NIDO 230.0" "LA FRESA 230.0" "2 " 1

DONE

**** CASE NUMBER **** 12
OPEN LINE
"SERRANO 230.0" "VILLA PK 230.0" "1 " 1
OPEN LINE
"SERRANO 230.0" "VILLA PK 230.0" "2 " 1
DONE

**** CASE NUMBER **** 13
OPEN LINE
"LITEHIPE 230.0" "HINSON 230.0" "1 " 1
OPEN LINE
"LITEHIPE 230.0" "MESA CAL 230.0" "1 " 1
DONE

**** CASE NUMBER **** 14
OPEN LINE
"BARRE 230.0" "VILLA PK 230.0" "1 " 1
OPEN LINE
"BARRE 230.0" "LEWIS 230.0" "1 " 1
DONE

**** CASE NUMBER ****15
OPEN LINE
"LA FRESA 230.0" "REDONDO 230.0" "1 " 1
OPEN LINE
"LA FRESA 230.0" "REDONDO 230.0" "2 " 1
DONE

**** CASE NUMBER **** 16
OPEN LINE
"CENTER S 230.0" "MESA CAL 230.0" "1 " 1
OPEN LINE
"CENTER S 230.0" "OLINDA 230.0" "1 " 1
DONE

**** CASE NUMBER **** 17
OPEN LINE
"ALMITOSW 230.0" "BARRE 230.0" "2 " 1
OPEN LINE
"ALMITOSW 230.0" "LITEHIPE 230.0" "1 " 1
DONE

**** CASE NUMBER **** 18

OPEN LINE

"LA FRESA 230.0" "HINSON 230.0" "1 " 1

OPEN LINE

"LA FRESA 230.0" "LAGUBELL 230.0" "1 " 1

DONE

**** CASE NUMBER **** 19

OPEN LINE

"HARBOR 230.0" "HINSON 230.0" "1 " 1

OPEN LINE

"HINSON 230.0" "DELAMO 230.0" "1 " 1

DONE

**** CASE NUMBER **** 20

OPEN LINE

"ALMITOSE 230.0" "CENTER S 230.0" "1 " 1

OPEN LINE

"ALMITOSW 230.0" "ALMITOSE 230.0" "1 " 1

DONE

**** CASE NUMBER **** 21

OPEN LINE

"REDONDO 230.0" "MESA CAL 230.0" "1 " 1

OPEN LINE

"REDONDO 230.0" "LITEHIPE 230.0" "1 " 1

DONE

**** CASE NUMBER **** 22

OPEN LINE

"DELAMO 230.0" "CENTER S 230.0" "1 " 1

OPEN LINE

"DELAMO 230.0" "ELLIS 230.0" "1 " 1

DONE

**** CASE NUMBER **** 23

OPEN LINE

"GOODRICH 230.0" "LAGUBELL 230.0" "1 " 1

OPEN LINE

"LAGUBELL 230.0" "RIOHONDO 230.0" "1 " 1

DONE

**** CASE NUMBER **** 24

OPEN LINE

"LBEACH 230.0" "LITEHIPE 230.0" "1 " 1

OPEN LINE

"REDONDO 230.0" "LITEHIPE 230.0" "1 " 1

DONE

**** CASE NUMBER **** 25

OPEN LINE

"LA FRESA 230.0" "REDONDO 230.0" "1 " 1

OPEN LINE

"LCIENEGA 230.0" "LA FRESA 230.0" "1 " 1

DONE

**** CASE NUMBER **** 26

OPEN LINE

"SERRANO 230.0" "VILLA PK 230.0" "1 " 1

OPEN LINE

"LEWIS 230.0" "VILLA PK 230.0" "1 " 1

DONE

STOP